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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,803	11/25/2003	Michael Shur	SETI-0010	6220

23550 7590 03/15/2007  
HOFFMAN WARNICK & D'ALESSANDRO, LLC  
75 STATE STREET  
14TH FLOOR  
ALBANY, NY 12207

EXAMINER
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ERDEM, FAZLI

ART UNIT	PAPER NUMBER
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2826

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/15/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/721,803

Applicant(s)

SHUR ET AL.

Examiner

Fazli Erdem

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11, 12, 14 and 21-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11, 12, 14 and 21-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, filed 2/28/2007, with respect to the rejection(s) of claim(s) 23, 24, 26-29 and 32-37 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Muller et al.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 11, 21 and 22 rejected under 35 U.S.C. 102(b) as being anticipated by Muller et al. (DE 100 32 062). (See submitted prior art non-patent document «Gas Sensitive GaN/AlGaN-heterostructures » by Schalwig et al. for translation purposes.)

Regarding Claim 11, Muller et al. disclose a gas sensor where in Figs. 2A, 3A and 4, it is discloses a field effect transistor 40 configured to sense a property of a medium, the FET comprising a source contact 12, a drain contact 13, a gate contact 74 where the gate contact defines a gate area disposed below and adjacent the gate contact, a sensing layer 77 for sensing property, wherein the sensing layer is disposed below the gate contact and wherein the sensing layer is exposed to the medium (gas) in the gate area and a dielectric layer 27 disposed between the gate contact and the sensing layer 77.

Regarding Claim 21, the sensing layer of 77 is gallium nitride (GaN)

Regarding Claim 22, source/drain contacts 72 and 72 are formed on GaN layer 77

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 12, 14 and 23-38 rejected under 35 U.S.C. 103(a) as being unpatentable over Muller et al. (DE 100 32 062). (See submitted prior art non-patent document «Gas Sensitive GaN/AlGN-heterostructures » by Schalwig et al. for translation purposes) in view of Schoning et al. (5,874,047).

Regarding Claim 23, Muller et al. disclose a gas sensor where in Figs. 2A, 3A and 4, it is discloses a field effect transistor 40 configured to sense a property of a medium, the FET comprising a source contact 12, a drain contact 13, a gate contact 74 where the gate contact defines a gate area disposed below and adjacent the gate contact, a sensing layer 77 for sensing property, wherein the sensing layer is disposed below the gate contact and wherein the sensing layer is exposed to the medium (gas) in the gate area and a dielectric layer 27 disposed between the gate contact and the sensing layer 77. Muller et al. fail to disclose the required perforations on the gate contact/electrode. However,

Schoning et al. disclose chemical sensors where in Fig. 3, gate electrode has perforations 3 to access the substrate 2.

It would have been obvious to one of having ordinary skill in the art at the time the invention was made to include the required perforations in gate 74 of Muller et al. as taught by Schoning et al. in order to provide a better/increased area access to the sensing layer 77.

Regarding Claims 12, the gate area of Schoning et al. includes at least one perforation as shown in Fig. 3.

Regarding Claim 14, in Schoning et al., gate electrode of Fig 3, has a gate insulating layer right under it and perforations 3 extend through gate dielectric layer.

Regarding Claim 24, the gate area of Schoning et al. includes at least one perforation as shown in Fig. 3.

Regarding Claim 25, in claim 3 of Schoning et al., the diameter of the perforations/pores disclosed to be from 1 nm or 10 micrometer which would satisfy area requirement of one square nanometer to ten square centimeters.

Regarding Claim 26, pores/perforations of Schoning et al. is more than one.

Regarding Claim 27, both Muller et al. and Schoning et al. disclose field effect transistors.

Regarding Claim 28, Muller et al. disclose a heterorestructure/compound semiconductor field effect transistor.

Regarding Claim 29, Schoning et al. disclose an ISFET (Ion Sensitive Field Effect Transistor) in column 2, lines 49-65 which is used to measure the Ph Level of a medium.

Regarding Claim 30, both Muller et al. and Schoning et al. disclose gate dielectric layer i.e. a second layer between the sensing layer and the gate contact/electrode.

Regarding Claim 31, in Schoning et al. Fig. 3, perforations/pores of extend below the gate dielectric/insulating layer to access the substrate 2

Regarding Claim 32, the sensing layer is AlGa<sub>N</sub> or Ga<sub>N</sub> in Muller et al. Figs. 2A, 3A and 4.

Regarding Claim 33, electrical contact/gate of Schoning et al. has perforations/pores as shown in Fig. 3. Furthermore, sensing layer of Muller et al. is a AlGa<sub>N</sub> or Ga<sub>N</sub> (gallium nitride) as shown in Figs 2A, 3A and 4, element 77.

Regarding Claim 34, in Schoning et al., gate electrode of Fig 3, has a gate insulating layer right under it and perforations 3 extend through gate dielectric layer.

Regarding Claim 35, sensing layer of Muller et al. is a AlGa<sub>N</sub> or Ga<sub>N</sub> (gallium nitride) as shown in Figs 2A, 3A and 4, element 77.

Regarding Claim 36, both Muller et al. and Schoning et al. disclose field effect transistors.

Regarding Claim 37, gate 74 of Figs 2A, 3A and 4 is a gate contact.

Regarding Claim 38, in paragraph 0030 of Muller et al. the Silicon Dioxide (SiO<sub>2</sub>) gate insulating layer is disclosed.

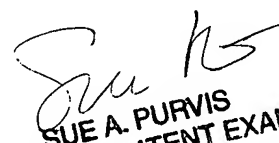
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fazli Erdem whose telephone number is (571) 272-1914. The examiner can normally be reached on M - F 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sue Purvis can be reached on (571) 272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

FE  
March 7, 2007

  
SUE A. PURVIS  
SUPERVISORY PATENT EXAMINER